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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Bhattacharya et al.

Serial No.: 10/056,343

For: CONTEXT-SENSITIVE CONSTRAINT DRIVEN
UNIQUIFICATION AND CHARACTERIZATION OF
STANDARD CELLS

Filed: January 24, 2002

Examiner: Kik, Phallaka

Customer No.: 27623

Group Art Unit: 2823

Confirmation No.: 8030

Attorney Docket No.: 162:7513USU

MAIL STOP NON-FEE AMENDMENT
COMMISSIONER FOR PATENTS
P.O. BOX 1450
ALEXANDRIA, VA 22313-1450

Dear Sir:

RECEIVED
OCT 21 2003
TECHNOLOGY CENTER 2800

AMENDMENT TRANSMITTAL FORM

Transmitted herewith is an Amendment with replacement drawings sheet for Figures 1 and 1a in the above-identified application.

Petition for extension of time pursuant to 37 C.F.R. §§ 1.136 and 1.137 is hereby made if, and to the extent, required. The fee for this extension of time is calculated to be \$ _____ to extend the time for filing this response until _____.

The fee for any change in number of claims has been calculated as shown below.

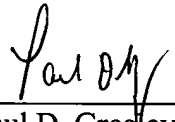
CLAIMS AS AMENDED						
	Claims Remaining After Amendment		Highest Number Previously Paid	Present Extra	Rate	
Total Claims	22	Minus	22	0	x \$18.00	\$0
Independent Claims	2	Minus	3	0	x \$84.00	\$0
MULTIPLE DEPENDENT CLAIM FEE				x \$280.00 = \$		
TOTAL FEE FOR CLAIM CHANGES				PAID		

The total fee for this amendment, including claim changes and any extension of time is calculated to be \$_____.

XXX One (1) sheet of replacement drawings for Figures 1 and 1a.

XXX The Commissioner is hereby authorized to charge any additional fees under 37 C.F.R. §§1.16 and 1.17 which may be required with this communication or during the entire pendency of the application, or credit any overpayment, to Deposit Account No. **01-0467**. A duplicate copy of this form is enclosed.

October 10, 2003
Date



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CERTIFICATE OF MAILING

I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE U.S. POSTAL SERVICE AS FIRST CLASS MAIL IN AN ENVELOPE ADDRESSED TO: MAIL STOP NON-FEE AMENDMENT, COMMISSIONER FOR PATENTS, ALEXANDRIA, VA 22313-1450, ON OCTOBER 10, 2003.

Kenroy A. Browne
NAME



SIGNATURE

10/10/03
DATE

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

RECEIVED
PCT OCT 27 2003
OHLANDT, GREELEY
RUGGIERO & PERLE, LLP
WRITTEN OPINION

(PCT Rule 66)

To:
PAUL D. GREELEY
OHLANDT, GREELEY, RUGGIERO & PERLE, LLP
1 LANDMARK SQUARE, 10TH FLOOR
STAMFORD, CONNECTICUT 06901-2682

Date of Mailing (day/month/year) **23 OCT 2003**

Applicant's or agent's file reference 162.7513WOU		REPLY DUE within <u>2</u> months/days from the above date of mailing
International application No. PCT/US03/02036	International filing date (day/month/year) 23 January 2003 (23.01.2003)	Priority date (day/month/year) 24 January 2002 (24.01.2002)
International Patent Classification (IPC) or both national classification and IPC IPC(7): G06F 17/50 and US Cl.: 716/3, 2, 7, 18		
Applicant ZENASIS TECHNOLOGIES, INC.		

1. This written opinion is the first (first, etc.) drawn by this International Preliminary Examining Authority.
2. This opinion contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2 (a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☒ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☒ Certain observations on the international application
3. The applicant is hereby invited to reply to this opinion.

When? See the time limit indicated above. ~~The applicant may, before the expiration of that time limit, request this Authority to grant an extension. See rule 66.2(d).~~

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.
For an informal communication with the examiner, see Rule 66.6

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.
4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 24 May 2004 (24.05.2004)

Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer PHALLAKA KIK Telephone No. (703) 308-1782
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[Signature]

WRITTEN OPINION

International application No.

PCT/US03/02036

I. Basis of the opinion

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☒ the description:
 pages 1-16, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____.
- ☒ the claims:
 pages 17-20, as originally filed
 pages NONE, as amended (together with any statement) under Article 19
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____.
- ☒ the drawings:
 pages 1-9, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____.
- ☐ the sequence listing part of the description:
 pages NONE, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____.

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the written opinion was drawn on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE _____
- ☒ the claims, Nos. NONE _____
- ☒ the drawings, sheets/fig NONE _____

5. ☐ This opinion has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed."

WRITTEN OPINIONInternational application No.
PCT/US03/02036**V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. STATEMENT**

Novelty (N)	Claims <u>2, 4, 5, 8-11, 16, 20</u>	YES
	Claims <u>1, 3, 6, 7, 12-15, 17-19, 21, 22</u>	NO
Inventive Step (IS)	Claims <u>10, 11</u>	YES
	Claims <u>1-9, 12-22</u>	NO
Industrial Applicability (IA)	Claims <u>1-22</u>	YES
	Claims <u>NONE</u>	NO

2. CITATIONS AND EXPLANATIONS

Please See Continuation Sheet

WRITTEN OPINION

International application No.

PCT/US03/02036

VI. Certain document cited**1. Certain published documents (Rule 70.10)**

Application No <u>Patent No.</u>	Publication Date <u>(day/month/year)</u>	Filing Date <u>(day/month/year)</u>	Priority Date (valid claim) <u>(day/month/year)</u>
US 6,618,834 B2	09 September 2003 (09.09.2003)	30 March 2001 (30.03.2001)	09 November 2000 (09.11.2000)
US 6,591,407 B1	08 July 2003 (08.07.2003)	01 March 2000 (01.03.2000)	None

2. Non-written disclosures (Rule 70.9)

<u>Kind of non-written disclosure</u>	Date of non-written disclosure <u>(day/month/year)</u>	Date of written disclosure referring to non-written disclosure <u>(day/month/year)</u>
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WRITTEN OPINION

International application No.

PCT/US03/02036

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the questions whether the claims are fully supported by the description, are made:

Claims 3-11 and 13-21 are objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claims are indefinite for the following reason(s):

As per claim 3 line 2, "can be" should be --are-- to clearly define what is being claimed.

As per claims 4-5 and 8-11, the claims are objected to for incorporating the above errors into the respective claims by claim dependency.

As per claim 6 line 1, --determining-- should be inserted after "comprises" to clearly provide for structural/functional relationship of the claim.

As per claim 7 line 1, --determining-- should be inserted after "comprises" to clearly provide for structural/functional relationship of the claim.

As per claim 13 line 1, "context" should be --context-of-use-- for proper antecedent basis.

As per claim 15 line 1, "context" should be --context-of-use-- for proper antecedent basis.

As per claim 15 line 1, "may include" should be --includes-- to clearly identify what is being claimed and for proper grammar.

As per claim 16, the claim is objected to for incorporating the above errors into the claim by claim dependency.

As per claim 17 line 1, the claim should depend on claim 12 to provide antecedent basis for "characterization"

As per claim 17 line 1, "of said IC design" should be deleted to provide for clear antecedent basis for the characterization step of claim 12.

As per claim 19 line 2, "criteria" should be --criterion-- to provide for proper grammar of required singular form.

As per claim 20 line 1, "criteria" should be --criterion-- for proper antecedent basis.

As per claims 18-21, the claims are also objected to for incorporating the above errors into the respective claims by claim dependency.

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

TIME LIMIT:

The time limit set for response to a Written Opinion may not be extended. 37 CFR 1.484(d). Any response received after the expiration of the time limit set in the Written Opinion will not be considered in preparing the International Preliminary Examination Report.

V. 2. Citations and Explanations:

Claims 1, 3, 6, 7, 12-15, 17-19, and 21-22 lack novelty under PCT Article 33(2) as being anticipated by YAMAZAKI (US 5,416,718).

As per claims 1, 12-15, and 22, Figure 4 illustrates all of the elements of the claim wherein the functional description corresponds to the functional specification inputted, the design constraints with context-of-use are associated with each of the optimizing steps/means (1 to 5, i.e., timing, load, delays, drivability, delay, which can be associated with circuit paths--region of a circuit design, wherein minimizing logical sequences inherently considers vectors characterization in order to minimize the logical sequences), wherein the desired implementation is generated as a result of steps/means 1-5, and wherein storage medium, program instructions are further described in col. 7, line 65 - col. 8, line 9 as part of the computer implemented system of YAMAZAKI.

As per claim 3, the determination whether the functional description and the constraint can be matched to the existing cell is further taught in col. 5, lines 3-17.

As per claims 6-7, the determination of at least one possible input permutation and/or complement is further taught in col. 6, lines 8-37.

As per claim 17-19 and 21, the characterization or evaluation of the IC circuit design is at the transistor level (see col. 6, lines 16-50 as an example), providing for portions or partitions or regions of circuit paths to be optimized, which accesses the standard cell library (i.e. comply with a standard-cell based IC design flow) as illustrated in col. 6, lines 17-68, in which the particular standard cell (i.e., from a library) is selected that suitably meets the particular design constraint (optimizing criteria).

Claims 4-5, 8-9, and 16 lack an inventive step under PCT Article 33(3) as being obvious over YAMAZAKI (US 5,416,718) in view of VAN FLEET et al. (US 6,190,433). YAMAZAKI discloses all of the elements of claims 3 and 15, which the claims depend respectively, including cell assignment with optimizing steps/means but failed to teach signature determination (including process corners restriction of vector characterization--i.e., ordering of variables). Such cell assignment optimization using signature determination is well known in the art and is further taught by VAN FLEET (col. 9, line 4 to col. 10, line 19). It would have been obvious to one of ordinary skilled in the art at the time of the invention to further incorporate the cell assignment optimization using signature determination as taught by VAN FLEET into the system of YAMAZAKI because such incorporation would provide for the necessary cell assignment optimization as required by the system of YAMAZAKI.

Claims 2 and 20 lack an inventive step under PCT Article 33(3) as being obvious over YAMAZAKI (US 5,416,718) in view of JONES et al. (US 5,666,288). Yamazaki disclose all of the elements of claim 1, which the claims depend, including the constraint/design criteria based on timing (including slew or delay), capacitances, drive strength (see Figs. 7-9), but failed to include other metrics/criteria of the constraint such as power, area, noise margins, footprint size, signal integrity and pin-placement. Such metrics are well known in the art for use in selection of the particular instance or cell implementation from the standard cell library

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

and is further taught by Jones as part of the library cell characterization for which the particular implementation of the cells are selected (see col. 1, line 63 - col. 2, line 7; col. 3, lines 29-65). It would have been obvious to one of ordinary skilled in the art at the time of the invention to further use other metrics/criteria of Jones as part of the system/method of Yamazaki for cell implementation selection because such metrics/criteria are well known in the art and would further provide for greater flexibility in optimizing the circuit design by providing more choices in the cell selection process, as further taught by Jones.

Claims 10-11 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest constraint for timing comprising a sorted list of rise times and falls times for use as part of the implementation determining process/step as claimed.

Claims 1-22 meet the criteria set out in PCT Article 33(4), and thus provide industrial applicability because the subject matter claimed can be made or used in industry, in as part of designing integrated circuits.

ANY RESPONSE MAY BE FAXED TO:
OFFICE OF THE SPECIAL PROGRAMS EXAMINER
TECHNOLOGY CENTER 2800
(703) 305-0843

----- NEW CITATIONS -----

US 5,666,288 A (JONES et al) 09 September 1997 (09.09.1997), see column 1, line 63 - column 2, line 7; column 3, lines 29-65.